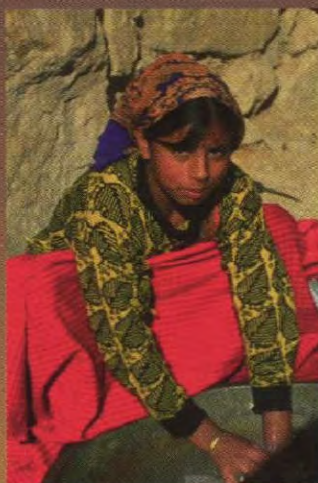


Forging a partnership for environmental action

An environmental strategy
toward sustainable development
in the Middle East and North Africa



The World Bank

The *Middle East and North Africa region* refers to the countries and territories of Algeria, Bahrain, Arab Republic of Egypt, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates, Republic of Yemen, and the West Bank and Gaza.

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Sources for charts: **Page 4**, "Real costs of environmental neglect," World Bank data. **Page 5**, "Trends in human exposure," World Bank data; World Resources Institute, *World Resources 1994-95* (New York: Oxford University Press, 1994). "Air pollution by source and sector," World Bank data. **Page 9**, "Running out of water," World Bank data. "Energy intensity," Organization for Economic Cooperation and Development, *Energy Statistics and Balances of Non-OECD Countries* (Paris, 1993).



Foreword

This booklet presents a strategy to promote environmentally sustainable economic development in the Middle East and North Africa. It provides an overview of the current problems of natural resource scarcity and environmental pollution in the region and of some of their quantifiable costs. It proposes a range of initiatives for responding to these problems, presents estimates of their costs, and suggests ways to finance them. The recommended response includes a multifaceted set of actions emphasizing appropriate incentives and selective investments to protect public health and the natural resource base within national institutional, legal, and regulatory frameworks. In addition to recommending actions to be taken by the countries of the region, the booklet identifies ways in which external agents—private investors, bilateral donors, and international organizations, including the World Bank—can support local efforts.

In view of the diversity in the region, the environmental strategy presented here has a regional perspective and does not apply specifically to any one country. I believe, however, that the publication of this booklet will stimulate governments to develop national programs to

ensure wise use of natural resources and arrest environmental degradation. To this end, the booklet includes an agenda for action. The World Bank stands ready to help national authorities to refine and implement such an agenda, building on the important efforts that many of them already are undertaking. The Bank is prepared to provide, at the request of governments, investment funds and policy advice by mobilizing resources in cooperation with other donors and by playing an active role in existing regional programs, such as the Mediterranean Environmental Technical Assistance Program (METAP), and in any new programs that the countries of the region initiate.

Finally, it is my hope that the booklet and the proposals it contains will contribute to the wider process of restoring the rapid, shared, and sustainable economic growth on which all our hopes for the prosperity and well-being of the people of the region must ultimately depend.

*Caio Koch-Weser,
Vice President, Middle East and North
Africa Region,
The World Bank*



Getting off the collision course

The countries of the Middle East and North Africa have made impressive, though uneven, progress in the past three decades. Per capita GDP has increased from \$1,500 in 1965 to \$2,000 in 1990. Infant mortality has fallen by half, and life expectancy has increased from 48 to 64 years. Education levels have improved: primary school enrollment

is nearly 100 percent, secondary school enrollment has tripled, and female enrollment has increased fivefold.

But this progress is threatened by the environmental damage that has accompanied it. Scarce water, degraded arable land, polluted air and

water, and inadequate sanitation threaten the region's capacity to maintain economic growth and absorb mushrooming populations, and impose enormous economic and human costs through disease and early death.

Though blessed with large oil and natural gas reserves, the region is poorly endowed with two other critical natural

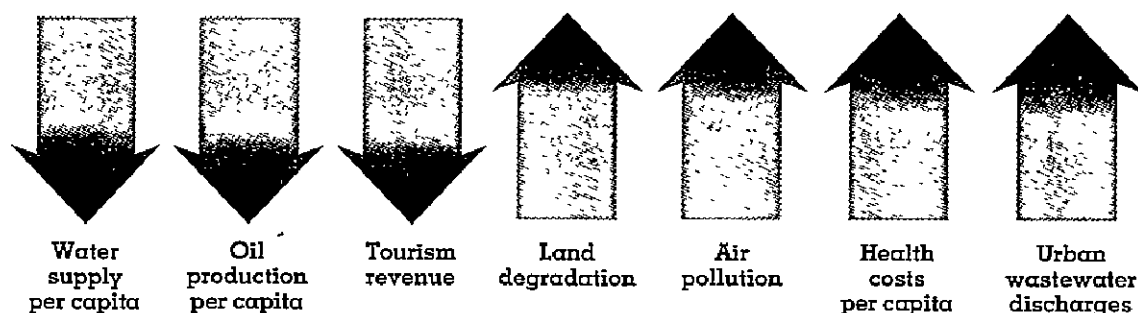
resources: productive land and accessible, renewable water resources. Only 6 percent of the region's land is arable, and the available supply of fresh water is limited. As a result, human settlements have been concentrated in a relatively small part of the land mass and food production has depended heavily on irrigated agriculture.

A development paradigm based on seeking food self-sufficiency and rapid industrialization has put increasingly unmanageable pressure on natural resources. Since the 1960s governments in the region have invested in intensive agricultural production, in large-scale infrastructure projects, and in such industries as cement, iron and steel, and fertilizers and chemicals. These investments have been supported by heavy subsidies for water, energy, agrochemicals, food staples, and public services.

This development strategy, required to meet the needs of a rapidly growing population, ignored conservation and efficient resource allocation. In agriculture, inappropriate farming methods, sedenterization, and improper water management fueled the waste of water

Development strategies based on seeking food self-sufficiency and rapid industrialization have ignored conservation and efficient natural resource allocation and pollution consequences

Lose-lose situation





resources; fragile pastures were overgrazed while productive pastures were converted to unsustainable crop cultivation; and low prices spurred the overuse of agrochemicals, leading to fouled runoff. Coastal zones and regional seas have come under increasing pressure, adversely affecting fisheries and, more important, tourism, one of the largest sources of foreign exchange revenue for several countries.

Urban pollution threatens public health in the region. Industries owned or subsidized by the public sector have had little ability or incentive to adopt cleaner technologies. Protective trade regimes, soft budget constraints, and the lack of environmental regulations have permitted the survival of old, highly polluting industries. Obsolete vehicle engine tech-

nology and low fuel efficiency have exacerbated urban air pollution.

Energy is another major polluter. Historically high energy subsidies, still around \$25 billion for the region, have provided little incentive for conserving energy and improving efficiency. Energy consumption per unit of output is almost twice that of other regions with comparable income levels, such as Latin America and the Caribbean.

Improving environmental management requires incorporating these social and economic costs into the overall development strategy—by implementing policies and programs that integrate economic growth, poverty reduction, and environmental sustainability. Reform now will be far less expensive than the cost of inaction.



The enormous costs of inaction

Today the region faces enormous development challenges

- Population growth averages 3.1 percent, the highest in the world. In one generation the urban population has mushroomed from 32 million to more than 130 million (54 percent of the total), far outpacing the growth of municipal services

- The water situation is precarious. Ten countries (Bahrain, Israel, Jordan, Kuwait, Libya, Oman, Qatar, Saudi Arabia, United Arab Emirates, and Yemen) and the West Bank and Gaza consume more than 100 percent of their renewable freshwater supplies, and nine countries (Algeria, Egypt, Iran, Iraq, Jordan, Lebanon, Morocco, Syria, and Tunisia) and the West Bank and Gaza have known problems of poor water quality

- About 45 million people have no access to safe drinking water, and 85 million lack safe sanitation. Only 20 percent of urban wastewater is treated,

compared with 60 to 70 percent in the United States and Europe

- Almost 60 million people (about 40 percent of urban dwellers) breathe dangerously polluted air from highly polluting industries, inefficient vehicles, leaded gasoline, and high-sulfur fuel oils

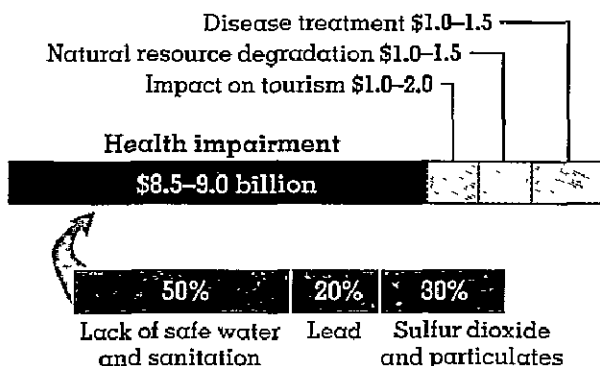
- Natural resource degradation—soil erosion, deforestation, and loss of biodiversity—is persistent and widespread. It is particularly severe in areas of Algeria, Morocco, Tunisia, and Yemen

- The region's unique cultural heritage, which helps to attract \$9 billion a year in tourism revenues, is threatened by pollution and uncontrolled development

That is the bleak situation today. Lost productivity from land degradation, including desertification, is estimated to cost roughly \$1 billion to \$1.5 billion annually. The health effects of pollution cost thousands of lives and diminish human productivity and well-being. When these effects are combined with other economic effects, the price of unsustainable development stands at \$12 billion to \$14 billion a year, roughly 3 percent of regional GDP. This is similar to the burden of environmental damage in Eastern European countries and two to three times higher than the cost in Western European countries. The figure does not account for certain losses that are difficult to quantify, such as damaged ecosystems, loss of biodiversity, and long-term effects of toxic pollution. Such damage often is irreversible and can undermine future growth by impairing land productivity and human health.

Real costs of environmental neglect

Conservative estimate: \$12 billion to \$14 billion a year—almost 3% of GDP





Future trends

In a decade, at current trends, things could get much worse:

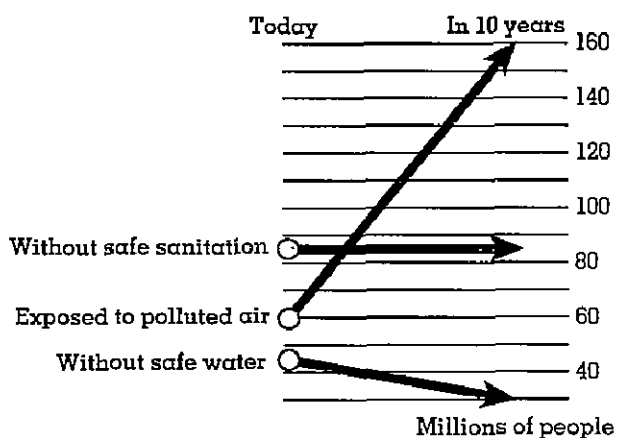
- The region's population will grow from 250 million (1990) to 340 million, increasing the demand for scarce water and arable land.
- About 160 million people will live in cities where air pollution exceeds World Health Organization (WHO) guidelines—impairing children's learning capacity, reducing labor productivity and overall human well-being, and slowing growth in tourism.
- Industrial pollution is likely to increase by more than 50 percent.
- Transport pollution will increase by more than 60 percent unless action is taken to replace obsolete vehicle engine technology and increase fuel efficiency
- The water crisis will become more acute—in fourteen of nineteen countries in the region demand is likely to exceed available renewable freshwater supplies by the year 2000.
- Left unchecked, land and forest degradation—already very serious—will worsen, posing a real threat to the region's agricultural base.
- The region's cultural property will be seriously damaged by uncontrolled

development, increased air pollution, and growing numbers of tourists

It is difficult to quantify the future costs of this environmental degradation. But together, these problems will jeopardize the region's prospects for economic and social development. And experience worldwide clearly demonstrates that failure to act now can only increase the cost and complexity of later remedial action. Prioritizing actions is the key to success. Problems that have an impact on human health or that lead to economic losses naturally would have a high priority.

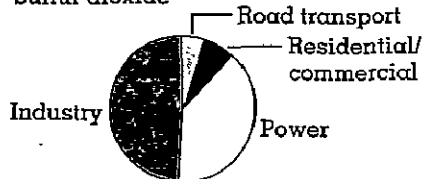
Trends in human exposure

Business as usual—1980s investment levels

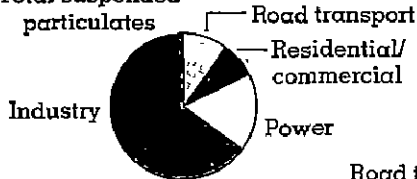


Air pollution by source and sector

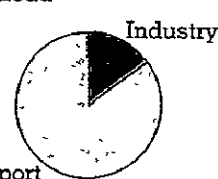
Sulfur dioxide



Total suspended particulates



Lead





A three-part strategy for sustainable development

Economic growth in the region has not been accompanied by policies and institutions to monitor and protect the environment, a failure that has discouraged conservation and led to inefficiency in the use and allocation of natural resources

Addressing the mounting environmental problems in the region will

Embedding economic growth in adequate incentive structures—incentives that encourage individuals and firms to conserve natural resources and reduce waste and pollution—will be the key to sustainable development

require exploiting the links between economic growth, poverty reduction, and environmental sustainability. The current and worsening water shortage and dwindling oil reserves in some countries require a development strategy that is consistent with the scarce natural resource endowment. Countries cannot

afford to wait for a deepening crisis to force change upon them.

Taking proactive action is essential. Development must be reoriented toward broadly based, private-sector-led growth. The growth should be rapid, widely shared, and sustained. It should depend less on the exploitation of rapidly declining oil, water, and land resources and more on the skills and resources of the region's people. Rapid private-sector-led growth can help governments speed up the closing of highly polluting and unprofitable public sector enterprises and help raise resources for environmental cleanup. Investing in the region's human resources and broadening access

to basic services are vital. Embedding economic growth in adequate incentive structures—incentives that encourage individuals and firms to conserve natural resources and reduce waste and pollution—will be the key to sustainable development

Equally critical is opening economies to regional trade, investment, and technology sharing; identifying and cooperating in mutually beneficial regional projects; and ensuring that regional economic institutions promote development and clean growth

Solutions to environmental problems must take into account the intersectoral and multidisciplinary nature of resource use. Strategies should use the range of tools available: incentives, investments, institutions, and public information. Too often countries have relied on investment and ignored economic incentives. Investments are needed, but they should be targeted on the basis of a careful assessment of priorities. An important question in deciding where to invest limited resources is how much environmental improvement can be achieved at different costs. Institutional and policy reforms are most likely to produce sustainable growth.

A three-part strategy—*strengthening institutions and participation, improving resource management, and arresting emerging pollution problems*—would reinforce sustainable development by balancing economic, environmental, and social concerns



Investments alone are not the answer

Incentives: change them

Policies need to work with the grain of the market rather than against it, using incentives rather than regulations where possible. Above all, incentives must stop encouraging inefficiencies and causing environmental damage. The most important steps are cutting subsidies for agricultural and energy inputs; increasing tariffs for services such as water, sanitation, and electricity; making polluters (both public and private) accountable; and providing secure tenure to encourage land improvements.

Institutions: strengthen them

Policy shifts will have little effect if institutions are not strengthened. This does not mean bolstering a ministry of the environment. It means strengthening institutions across the board by developing legislation and administrative structures, providing needed skills, ensuring funding, decentralizing power and control, and strengthening the capacity to set, monitor, and enforce environmental standards. It is essential to close the gap between making policy and carrying it out. As economic liberalization continues and the private sector becomes more active, the role of environmental institutions would be to foster trade and private investment while protecting the environment.

Investments: target them

Investments will be crucial, but they must be accompanied by necessary policy reforms and targeted to efforts yielding the greatest returns. Investments will yield few returns if the right incentives and institutions are not in place. Encouraging private sector investment in environmental management and recovering costs for resources and services are essential to reduce the financial burden on governments' budgets.

Information: get it to the public

Changing incentives, institutions, and investments will not be easy because political pressures make environmental policymaking especially difficult. The most important effect of improved information and environmental education is change in behavior. Well-informed citizens are in a better position to put pressure on governments and polluters and more likely to accept the costs and inconveniences of environmental policies. But information is not enough. People must be given the opportunity to actively participate in making decisions about the environment in which they live.



1. Strengthening environmental institutions and public participation

Environmental management is a relatively new field in the region, so building institutional capacity in environmental policymaking is a top priority. Building capacity will require well-focused assistance to improve managerial and technical capacity and to strengthen the monitoring and enforcement of environmental quality standards. It will also require publicizing environmental risks and involving the public in setting priorities and making decisions. Increased

awareness of environmental problems can spur public action and the willingness to pay for environmental services.

To improve policy formulation and coordination, monitoring, and enforcement,

governments need to

- Strengthen the ability of public agencies to execute these functions, set priorities, and assess environmental risks. One way is to "learn by doing," while tailoring public assistance to environmental problems. Addressing pollution "hot spots," for example, is a practical way of targeting capacity building assistance.

- Reorient national environmental action plans to analyze the environmental implications of economic and sector policies, set priorities for action, and propose mechanisms for resource mobilization.

- Ensure that laws support an integrated approach to pollution control, establish realistic and location-specific environmental standards, and require environmental impact assessments for all major new investments.

- Give priority to monitoring and enforcement where pollutants pose the greatest threat to public health.

To increase public participation in environmental management, governments need to:

- Gradually decentralize the operational functions of environmental management to municipal and local levels, ensuring that these local institutions have sufficient financial autonomy and management capacity to carry out their expanded roles.

- Release information regarding water quality, hazardous emissions and wastes, and the conservation of nature.

- Involve affected populations, local nongovernmental organizations (NGOs), and the media in decisionmaking regarding environmental issues by, for example, holding public consultations and conducting participatory environmental audits.

The institutional capacity of countries to handle environmental issues varies across the region, but overall, technical expertise and authority still need to be strengthened. Oman and Tunisia have made great progress in strengthening their capacity in environmental policymaking. Algeria, Egypt, Morocco, and Saudi Arabia are restructuring their environmental institutions. Risk assessment has been introduced in Algeria, Egypt, and Tunisia to identify priorities. Several countries, including members of the Gulf Cooperation Council, have made environmental impact assessments mandatory for new development projects. Public access to environmental information has improved but much more effort is required to achieve real public participation in environmental management.

Building institutional capacity in environmental policymaking is a top priority. Key issues are monitoring and enforcement and participation.



2. Improving the management of scarce natural resources

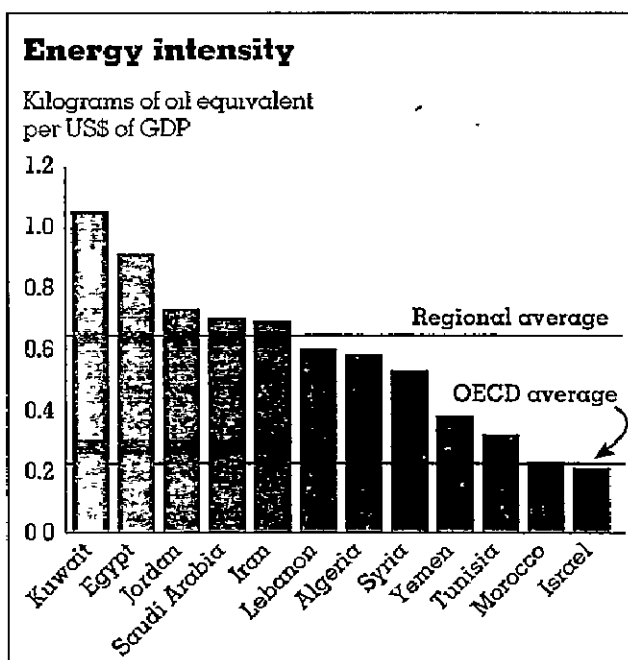
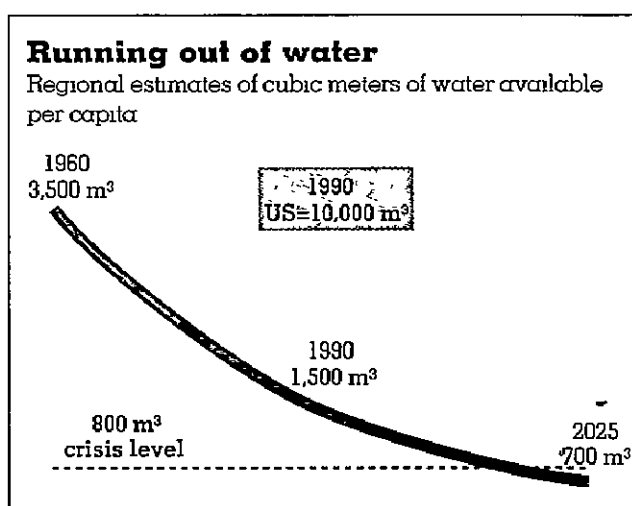
The scarcity of water and arable land in the region is a fundamental constraint to its future economic growth. Energy, though historically plentiful, will also become scarce if current consumption patterns continue. The problem requires reorienting development away from mining the natural resource base by improving management—increasing efficiency and reducing waste—through the following three actions

- Adapt to increasing water scarcity by increasing water prices to encourage conservation and mobilize financial resources for investments and by strengthening institutions to mediate conflicts and introduce integrated water resources planning and management.
- Remove subsidies on energy, fertilizers, pesticides, and other agrochemicals
- Intensify efforts to encourage the adoption of proven technologies for the efficient use and conservation of water, land, and energy by conducting information campaigns, introducing incentives such as environmental taxes and pollution charges, and removing trade barriers to new technology

Many countries already are reforming the way in which they manage their natural resources. Egypt, Morocco, Syria, and Tunisia are implementing integrated water resource management. Jordan and Tunisia are increasing the price of irrigation water. Energy conservation and efficiency measures have been introduced in industry in Egypt, Morocco, and Tunisia. Jordan is rationalizing energy prices and restoring the financial viability of its energy sector by commercializing

power enterprises. Egypt has eliminated pesticide subsidies, and Morocco and Tunisia have removed fertilizer subsidies.

A new policy of reliance on markets and price signals can be expected to help redirect resources to high-value uses, encourage conservation, and reduce the scale of extra investment needed simply to maintain current levels of per capita resource availability. Continuing and reinforcing these reforms, though a difficult task, is vital and urgent.





3. Arresting emerging pollution problems

Urban and industrial pollution and the lack of access to safe water and sanitation are posing increasing threats to public health. Antipollution measures generally have been directed at only one medium, such as water or air, often resulting in the more rapid deterioration of another medium. Integrated pollution control should address the impact on all media and focus on waste reduction and recycling to prevent pollution.

To promote clean industries, governments should

Financially viable public enterprises should bear the costs of cleanup. Highly polluting public and private enterprises that are not financially viable and cannot be restructured should be shut down.

- Encourage private investment in clean industry by removing tariff and nontariff barriers to the adoption of clean process technology.

- Apply the polluter-pays principle so that enterprises pay the costs of pollution, and establish licensing procedures to ensure that pollution

control measures are taken.

To clean up "hot spots" where pollution is endangering human health or ecosystems, governments should:

- Improve the quality and extend the coverage of environmentally safe water and sanitation services by enhancing the operation and maintenance of existing services, rehabilitating nonoperational treatment plants, and encouraging investment in appropriate, low-cost technologies.

- Identify and rank hot spots through environmental audits, and then develop least-cost mitigation plans to form the basis for compliance agreements with polluting firms on phased reductions in emissions.

- Ensure that financially viable public and private enterprises bear the costs of cleanup. Highly polluting public enterprises that are not financially viable and cannot be restructured should be shut down.

- Reduce air pollution from transport and energy sources by phasing out leaded gasoline and high-sulfur fuels, establishing emissions standards for new vehicles, and accelerating natural gas development.

Several countries are beginning to tackle emerging pollution problems. Algeria, Morocco, and Saudi Arabia are adopting an integrated approach to pollution control in selected industrial areas. Coastal oil pollution is being addressed regionally by Algeria, Morocco, and Tunisia through guidelines and regulations. Many countries in the region are investing in wastewater treatment facilities. Tunisia stands out for its strides in wastewater treatment. Algeria, Egypt, Morocco, and Tunisia have initiated pollution audits for industries and municipal governments, assisted by METAP. Egypt and Tunisia, with the assistance of donors, have begun cleanup operations for specific industries. Tunisia has established a fund for loans to finance industrial cleanup. Algeria is preparing a program with the World Bank to reduce hazardous wastes that are harmful to human health. And Morocco is developing a program with the help of the Bank to clean up the highly polluted Sebou River basin using an integrated approach. Such efforts need to be reinforced and extended. More attention also needs to be paid to the removal of energy subsidies and the adoption of clean process and renewable energy technologies.



Industrial pollution cleanup can pay for itself

Several countries have found alternative technologies that allow for continued profitability while reducing pollution.

Egypt. The Rakta integrated pulp and paper mill in Alexandria creates two tons of waste for every ton of rice straw pulp it produces. An environmental audit determined that end-of-pipe treatment without in-plant measures would cost about \$500 per ton of paper, approaching the \$600-per-ton production cost. But a change in technology may prove a viable alternative; initial estimates indicate that it would produce a rate of return far better than the prohibitive end-of-pipe treatment.

Syria. Several technology changes would have short payback periods at the General Fertilizers Company in Homs. One, for a \$1 million investment, would increase ammonium nitrate production by 5 percent and reduce nitrous oxide emissions by 90 percent, from 32 tons a day to about 3 tons. A scrubber for nitrous oxide emissions, costing \$750,000, would pay for itself in three years. And \$1 million would buy fabric filters to recover urea dust, another investment that would pay for itself in three years.

Algeria. Wastewater from the Celpap pulp and paper factory accounts for half the pollution in the Oued el Harrach. Treating it would make it possible to supply enough water for 150,000 people. The Enip Chlor-alkali production plant in Skikda has an amalgam process that creates mercury pollution. Modifying the amalgam process to reduce pollution would cost \$30 million. Convert-

ing to membrane technology, which uses no mercury, would cost about \$80 million, but the investment would pay for itself in three to five years.

Tunisia. The Groupe Chimique company in Gabes could reduce sulfur dioxide emissions by scrubbing the emissions with ammonia and recovering ammonium sulfate. This approach could result in foreign exchange savings of about \$1 million a year.

Iran. The copper smelter at Sar Cheshme uses an outdated production technology based on reverberatory furnaces and Pierce-Smith converters. The smelter has no controls for sulfur emissions, estimated at 1,000 kilograms per ton of copper produced, or about 125,000 tons a year. Normally, sulfur dioxide emissions could be reduced by making sulfuric acid from the furnace gases—about 100 kilograms per ton of production. The most advanced processes emit less than 5 kilograms of sulfur dioxide per ton of copper. The investment in this advanced technology would reduce sulfur dioxide emissions at a cost of about \$100 a ton. If the value of energy savings and sulfuric acid is included, the investment is likely to yield a positive rate of return.

These are only a few examples of possible investments for environmental improvements that pay for themselves. But constraints—such as public enterprises' lack of financial autonomy, import restrictions, lack of information, and lack of access to credit—often prevent such investments from being undertaken.



Costs and financing

Clearly no blueprint for sustainable development can be drawn for the region as a whole. A regional strategy can, at best, give a general idea of what needs to be achieved at the country level. Each country will then have to travel its own path based on its particular problems, constraints, and comparative advantages.

Essential tools for developing country-level action agendas are national environmental action plans. These action plans must be well coordinated with all sector,

To the extent possible, costs should be transferred from governments to resource users and polluters, and cost recovery mechanisms put in place to finance new investments

finance, economy, and planning ministries. They must set environmental priorities and identify relevant projects, explicitly examine the environmental implications of policies, investigate mechanisms to mobilize resources, and encourage

participation by all concerned parties

Institutional and policy reforms and increased public awareness, not investments alone, are prerequisites for sound environmental management. Implementing reforms to promote more sustainable development will not come free of cost. A first estimate puts the cost at \$60 billion to \$80 billion over the next decade, or about 1.5 percent of regional GDP if the investments are spread over ten years. This compares favorably with environmental management costs in most OECD and some transition countries, which spend about 1 to 2 percent of GDP on environmental protection each year. Major benefits from these investments include health improve-

ments from the provision of safe water and sanitation, increased agricultural productivity, and less air pollution. As noted above, these investments cost far less than ignoring continuing environmental damage.

Most of the financing for these investments will have to be raised from domestic sources, though not necessarily from the public budget. To the extent possible, costs should be transferred from governments to resource users and polluters, and cost recovery mechanisms put in place to finance new investments. Starting now, the region can raise funds through market-based mechanisms, by

- Increasing electricity and water prices so that they reflect the full cost of supply. Energy subsidies in the region are estimated at \$25 billion a year; annual costs of water supply investments not currently recovered are about \$12 billion.

- Introducing pollution charges to discourage pollution and raise revenues. If the region could bring charges to levels comparable to those in Poland by 2005, it would raise \$1.7 billion a year.

- Recovering the costs of solid waste management, wastewater treatment, and sanitation through efficient pricing.

- Levying a tax on harmful additives to gasoline to internalize the health costs of pollution. A tax on lead equivalent to 10 cents a liter of gasoline could raise \$2 billion a year if imposed on 50 percent of current gasoline consumption.

All these measures play a dual role—they raise funds for new investments, and they provide incentives for more efficient resource use.



The private sector also can play an important role in environmental management

■ Private firms can be encouraged to finance environmental investments and to manage water and wastewater treatment plants, sanitary landfills, and spe-

cial industrial waste facilities on a user-charge basis.

■ Foreign private investment and joint ventures can expand natural gas supply, upgrade domestic automobile and truck technology, and introduce clean industrial and energy technology.

Tentative ten-year private and public investment requirements

Problem/action	Total investment (billions of 1990 US\$)	Expected benefits
Institutional capacity building (staffing, training, public information and participation, and monitoring equipment).	0.1-0.3	More environmentally sustainable policy framework, improved priority setting, stronger monitoring and enforcement of environmental standards, increased public participation and willingness to pay.
Industrial air pollution.	4-6	Annual gain of 2 million years of life through better health.
Substitution from high- to low-sulfur fuels, or to natural gas.	4-5	
Industrial water pollution	8-14	Increased supply of safe municipal and irrigation water.
Industrial hazardous waste	3-4	Diminished health risks.
Full urban and rural coverage of safe water and sanitation, including 55 percent urban coverage of municipal wastewater treatment (above and beyond 1980s investment levels).	19-21	Annual gain of 3 million years of life through better health.
Natural resource management.	10-15	Reduced productivity losses, improved watershed protection and biodiversity conservation.
Full coverage of safe municipal solid waste management.	4-6	Cleaner urban environment and reduced health risks.
Substitution of 50 percent of gasoline to unleaded.	6-7	Sixty-five percent reduction in health impacts of lead that particularly affect children.
Total	58-78	



Socioeconomic constraints to reform

Governments face many pressures in implementing the reforms urged here. Interests often conflict, and governments themselves find it hard to curb environmentally damaging policies and polluting public enterprises because of the political consequences. Citizens benefit from using environmental resources without paying for them. Requiring that businesses and consumers pay the real costs

Requiring that businesses and consumers pay the real costs of natural resources and services and that polluters pay for pollution is an unattractive, but essential, political task

of natural resources and services and that polluters pay for pollution is an unattractive, but essential, political task. Political difficulties can be eased by making the most of "win-win" opportunities. The net gain of "win-win" policies, such as removing energy subsidies, can

then be used to compensate the "losers."

The poor suffer the most from environmental degradation. They typically live on marginal, erosion-prone land or in urban slums close to polluting industries and without access to piped water or adequate sanitation. They are the ones who struggle to make ends meet as their crop yields decline and whose children die from diseases caused by polluted water.

The impact of environmental policy reforms on the poor depends on many

factors. In urban areas the poor often are willing to pay for water and sanitation services, because these services may actually cost them less than, for example, buying water from private vendors. Increasing the resources available to governments through improved cost recovery can make it possible to extend services to the unserved poor.

In rural areas the link between poverty and environmental degradation is more complex. Environmental policy reform will have both positive and negative effects. For example, soil and water conservation programs that involve local participation may benefit small farmers, while increasing irrigation water prices may hurt them.

Several strategies can help people cope with poverty and land degradation. Farmers and herders on arid and semi-arid land can be encouraged to take up nonfarm employment. And farmers can be encouraged to improve their land if they are provided more secure land tenure and market incentives. Policies and regulations should be grounded in local realities, traditions, and natural resource management strategies. The social impact of policies should be assessed before they are implemented. Based on such assessments, targeted measures that minimize adverse effects without offsetting the reform objectives can then be designed and implemented.



Agenda for action

Translating this strategy into effective action is the greatest challenge facing the countries in the region. The challenge for the donor community is to be a partner in this task. Given the diversity among the countries in the region, actions to implement the strategy must be specified at the country level. But there are five actions that all countries must take to integrate environmental concerns into the overall development agenda.

■ **Reevaluate national environmental strategies.** The focus should be on setting immediate priorities for action (particularly where human health is affected), identifying mechanisms to mobilize resources, and examining the environmental implications of economic and sector policies. This process should be the responsibility of the ministry of the environment, working in full collaboration with the ministries of planning, finance, economy, and health. *Time frame: 9 months.*

■ **Implement the right policies.** Policy-makers should examine the environmental implications of, and develop plans for the removal of, any remaining subsidies (agricultural chemicals, energy, and water), introduce cost recovery for service provision (municipal water supply and wastewater treatment, solid waste management, irrigation water); remove impediments to the adoption of clean and resource-efficient technology; and examine the feasibility of "green" taxes and pollution charges and of introducing taxes on harmful gasoline additives such as lead. The responsibility for these steps should fall on the environment, finance,

and sector ministries and on local governments. *Time frame: 6 months.*

■ **Implement the critical next steps for improving environmental institutions.** The focus should be on strengthening environmental regulations and the capacity of the legal system to monitor and enforce them. The responsibility for this capacity building exercise would fall on the ministries of the environment, finance, and justice and on local governments. *Time frame: 24 months.*

■ **Take immediate steps, in conjunction with nongovernmental organizations, to increase public awareness of the need for water, energy, and soil conservation, to prepare grass-roots environmental action plans, and to encourage maximum participation in formulating and implementing these plans.** The leadership responsibilities should fall on the ministries of environment and social affairs and on local governments. *Time frame: 24 months.*

■ **Develop targeted investment plans for top-priority investments in safe water and sanitation services, especially in rural areas, clean up identified "hot spots" where problems of air quality, industrial and municipal water pollution, and solid waste tend to converge; and increase the supply of clean energies (unleaded gasoline, low-sulfur fuels, and natural gas).** The responsibility should fall on the ministries of environment, energy, and industry and on local governments. *Time frame: 9 months.*

Because the environment affects the responsibilities of all ministries, all should be involved in solving problems.



Local nongovernmental organizations.

Local NGOs will have an important role to play in this action plan. NGOs should participate in the public debate on environmental issues and assist communities and interest groups in developing and executing local plans. They can develop environmental education materials and organize awareness campaigns. They also can design and implement small urban and rural environmental projects.

Private sector. The private sector has an expanding role to play in environmental

management, but its effective participation depends on a conducive policy environment. Governments can work in partnership with the private sector by inviting it to finance environmental investments and manage water and wastewater

treatment plants and sanitation and waste services on a user-charge basis. The private sector can also contribute to clean growth by investing in clean industrial transport and energy technology.

The World Bank and other international donors. Much of the funding for reform will come from domestic sources, but external assistance—both technical and capital—will remain important in the short to medium term. The World Bank, along with bilateral donors, regional banks, and other development institutions, can provide such assistance directly and in collaboration with donors through programs such as the Mediterranean Environmental Technical Assistance Program (METAP). Besides the World Bank, this collaborative four-year effort has involved the European Union,

European Investment Bank, United Nations Development Program, Swiss International Academy for Environment, German Agency for Technical Cooperation, and the government of Monaco, among others. METAP has channeled about \$24 million to the region for capacity building, policy improvement, and identification of investment opportunities.

International donors need to coordinate development assistance closely with the priorities emerging from the national environmental action plans to enhance its effectiveness in helping countries to embark on a course of more sustainable development. International donors also need to increase the flexibility and range of instruments for providing assistance. They need to seek opportunities to blend donor grants with the financing from international financial institutions to lower the overall cost of environmental investments where warranted by environmental externalities. Finally, international donors need to promote the introduction of economically viable clean technologies through grant-financed technical assistance programs. Such programs could include twinning arrangements between enterprise and public sector management teams.

In partnership with the donor community, the World Bank will work to assist countries in translating sustainable development objectives into concrete and practical action. In particular, the Bank will:

- Immediately assist clients in reevaluating their environmental strategies and implementing their environmental action plans

Much of the funding for reform will come from domestic sources, but both external technical and capital assistance will remain important in the short to medium term



■ Go beyond financing investments on the basis of good environmental impact assessments to financing activities that are pro-environment and provide cost-effective solutions to the most serious cases of environmental degradation.

Investments addressing the many "hot spots" identified should receive priority, as should pilot programs to develop more participatory, integrated, and cost-effective approaches to natural resource conservation and management.

■ Actively pursue with clients analytical work to integrate environmental considerations into their overall economic and public enterprise reform programs, focusing on the feasibility of introducing "green" taxes and pollution charges.

■ Collaborate with other development agencies and donors to mobilize resources to support strategic country-level environmental investments and capacity building programs.

■ Promote regional collaboration on environmental issues. In this regard, the Bank will work to strengthen METAP by

ensuring that it better reflects country priorities as these are refined and articulated in response to this strategy, improves its operational structure to allow increased country and regional participation, and focuses on mobilizing additional resources so that identified investment projects can be implemented.

The Bank is committed to responding to the leadership shown by countries willing to act on this agenda. It will work—directly and in collaboration with other donors that have long provided support on environmental issues—to develop programs to deal with the priority environmental problems. The challenges are formidable, but the costs of securing the future for this generation and future ones are manageable with close cooperation and partnership for action.

Partnerships are needed between Middle Eastern and North African countries to share relevant experience, between donors and financial institutions to blend resources, with NGOs to build public awareness, and with the industrial countries to share technology and increase trade and tourism

Priority action areas for sustainable development

	Iran	Algeria	Morocco	Tunisia
STRENGTHEN THE CAPACITY AND ROLE OF ENVIRONMENTAL INSTITUTIONS				
Focus on three functions: policy, coordination, and enforcement	★	★	★	◆
■ Strengthen the capacity of environmental staff				
■ Establish/strengthen the legal framework				
■ Establish monitoring systems (especially in hot spots)				
■ Enforce licensing requirements				
Ensure public access to environmental information	★	★	◆	◆
■ Publish information on water quality, hazardous emissions, and waste				
■ Hold consultations on environmental issues with affected parties, local NGOs, and the media				
CONTINUE TO MANAGE SCARCE NATURAL RESOURCES				
Water	★	★	★	★
■ Establish a system for mediating between sectors and user groups for improved water allocation				
■ Accelerate the adoption of proven technologies for the efficient use of water				
■ Increase prices and reduce subsidies for water				
Arable land, ecosystems, and cultural heritage	◆	◆	◆	◆
■ Clarify and secure land property rights				
■ Remove impediments to market pricing for fertilizers, pesticides, and other agrochemicals				
■ Regulate the protection of fragile lands, crucial ecosystems, and cultural heritage				
Energy	★	★	★	★
■ Accelerate the adoption of proven technologies for the efficient use of energy				
■ Accelerate substitution to natural gas				
■ Begin conversion to low-sulfur fuel oils				
■ Promote conversion to unleaded gasoline				
■ Remove remaining energy subsidies				
BEGIN TO SOLVE EMERGING POLLUTION PROBLEMS				
Prevent pollution from new sources	★	★	★	◆
■ Remove impediments to adoption of clean industrial and transport technology (import restrictions, subsidies)				
■ Internalize the social cost of pollution				
Clean up hot spots	★	★	★	◆
■ Prioritize environmental problems and prepare least-cost mitigation plans				
■ Close down highly polluting, nonviable public enterprises				

Needs to be initiated

In progress, some components already in place

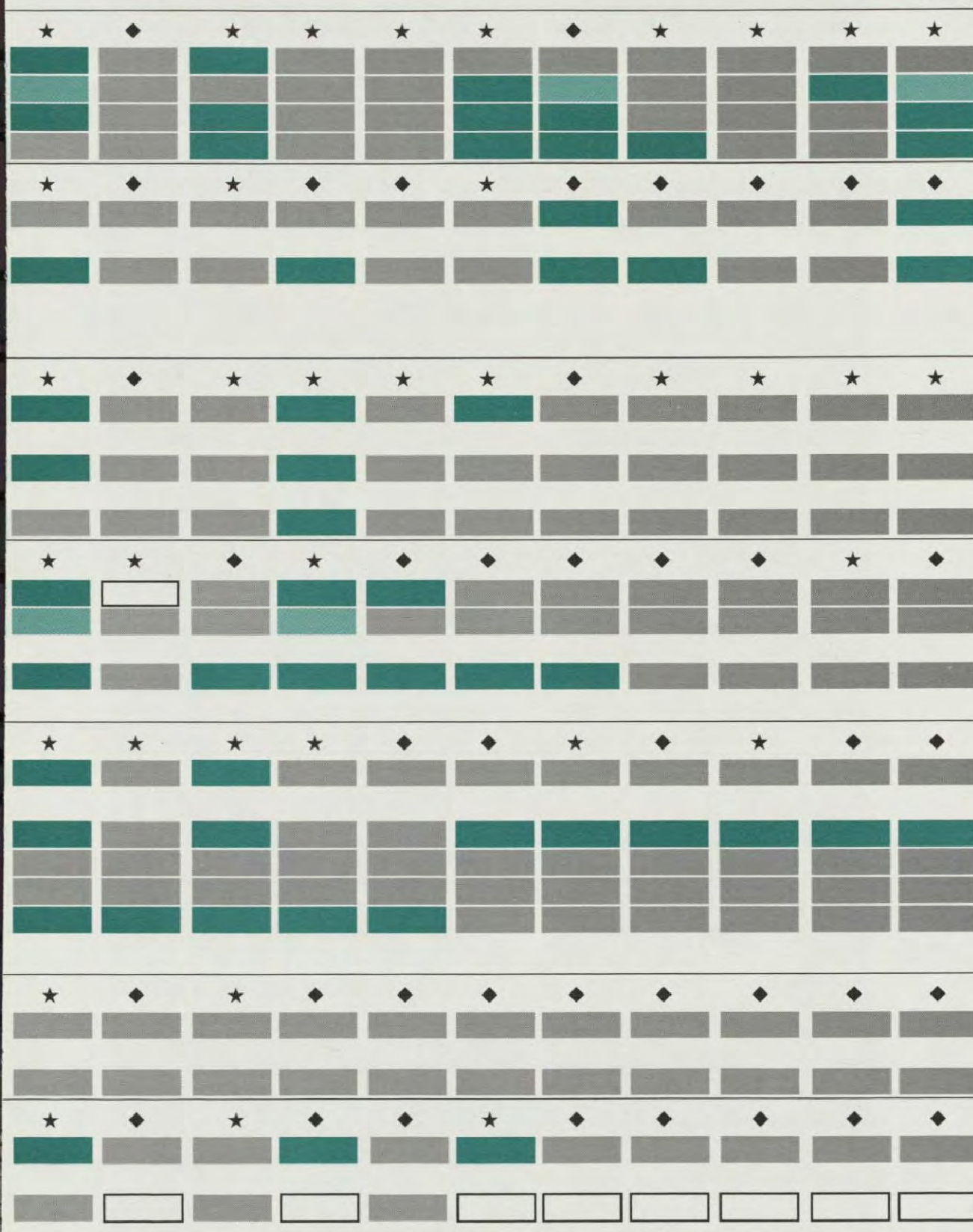
Implemented

Not applicable

◆ Important

★ Very important

Egypt Lebanon Syria Jordan Yemen Saudi Arabia Oman U. Arab Emirates Bahrain Qatar Kuwait





Industrial pollution hot spots

Iran. Much of Iran's industrial activity is located in and around Tehran and Tabriz. In addition to pollution from heavy industries, an important concern is the discharge of heavy metals from tanneries and the electroplating industry. Most of the 400 electroplating shops in Tehran discharge their wastewater directly into the drainage system without treating it, severely polluting groundwater in the southern part of Tehran.

Egypt. Helwan, located 20 kilometers south of Cairo, is the hottest "hot spot" in Egypt. Industrial activities started in the region in 1955 and peaked during the mid-1960s. Since 1967 the government, concerned about the growing environmental deterioration, has permitted few enterprises to operate in the area. But the existing enterprises, most of which are publicly owned, are highly polluting. Emissions from three large cement plants cause air pollution, a lead smelter emits hazardous wastes, a coke and chemical plant produces carcinogenic emissions, large steel plants emit hydrocarbons and heavy metals, and power plants give off sulfur dioxide emissions.

Tunisia. At least 12 percent of Tunisia's 10,000 officially registered industrial establishments have been identified as major polluters. Industries are concentrated in Tunis, Bizerte, Sousse, Mahdia, Sfax, Gabes, and Gafsa. During 1972-91 about 40 tons of phosphogypsum were discharged into the sea at Sfax and Gabes, leading to the closure of beaches in the area.

Algeria. Since the 1980s many small industrial units have been built in densely populated residential

areas, where they are causing increasing health problems. There is severe air pollution in Annaba from ammonia and sulfuric acid plants, and acute contamination of surface, ground, and sea water in the provinces of Annaba, Skikda, Algiers, and Oran from petrochemical complexes.

Morocco. Industrial production is concentrated in the Casablanca-Mohammedia area. Approximately 10,000 tons of oxidizable materials are discharged annually into the Atlantic Ocean from seven major river basins. The principal industrial pollutants stem from the production of phosphoric acid (uranium and phosphogypsum), cellulose, dyes, leather, and textiles (chromium, zinc, nickel, cadmium, and cyanides).

Jordan. The Amman-Zarqa region is the largest urban center in Jordan, housing nearly half the country's population. The region also has the largest concentration of industries. In the Zarqa basin air pollution results from emissions from a refinery and a thermal power station. High levels of sulfur dioxide, hydrogen sulfide, carbon monoxide, particulates, and nitrous oxides are observed in the region.

Syria. Major environmental pollution problems exist in the cities of Damascus, Homs, Hama, and Aleppo. In Damascus the Barada River has been polluted by discharge from tanneries and electroplating shops and cannot be used as a source of drinking water. In Aleppo water pollution from tanneries is a major problem. In Homs and Hama there is serious air and water pollution from the refinery, the iron and steel plant, and the fertilizer plant.



Water quality hot spots

Lake Manzala, Egypt. Lake Manzala, one of the Nile-Delta's four lakes, receives untreated industrial and municipal sewage with high concentrations of heavy metals. Irrigation return flows high in toxic pollutants (DDT and PCBs) also discharge into Lake Manzala, where fish production has dropped more than 70 percent in recent years. Rural communities using the polluted water for irrigation are susceptible to serious health effects. The World Health Organization estimates that waterborne diseases cause more than 90,000 deaths a year in Egypt.

Zarqa basin, Jordan. Ninety percent of the country's industries are located in its most densely populated area, the Zarqa basin. Most of the area's industrial and municipal effluents drain into the King Talal reservoir—the main source of irrigation water for the Jordan Valley and of drinking water for Amman. The reservoir receives partially treated sewage, and effluents from the petroleum refinery, the slaughterhouse, and other industries in the area.

Algiers Bay and Oued el-Harrach, Algeria. All four water treatment plants in Algiers function poorly, discharging untreated and partially treated wastewater. The Mitigja aquifer is contaminated by leachates from nearby municipal dumps. Industrial wastewater pollution is a major problem in Oued Sir, Kaddara, Bani Amran, and Oued el-Harrach. Major pollutants include phenol, waste oils from the oil refinery, detergents, and heavy metals (mercury, zinc) from chemical industries.

Sebou River basin, Morocco. In the 35-kilometer stretch near Fez, the Sebou River is almost devoid of oxygen. Agricultural runoff flowing into the river causes severe eutrophication, and untreated municipal sewage results in high coliform levels near discharge points. The river also receives pollutants from nearby industries. Waterborne diseases are the main cause of morbidity in the region among children age 0 to 4.

Lake Bizerte, Tunisia. Municipal and industrial pollution is the main cause of water quality degradation in Lake Bizerte. El Fouldah discharges more than 700,000 cubic meters of wastewater a day into the lake. And discharges from the nearby steel works, oil refinery, waste oil processing, and cement plant have led to high levels of lead and cadmium.

Karaj River and Dam, Iran. With no central sewer system, Tehran discharges its domestic wastewater—more than 1.6 million cubic meters a day—into septic pits and drainage canals, polluting aquifers and the Karaj River, whose water is used by rural settlements downstream. In Tehran the annual biological oxygen demand load discharged by industry is more than 35,000 tons.

Hab water source, Lebanon. The water at the Hab source in Tripoli is polluted mainly by upstream oil processing plants, which discharge their wastes directly into the river, and by municipal sewage from villages in the Kura Caza. Nearly all water sources in the region show the presence of coliform bacteria.



Land use, 1989-91

	Cropland (thousands of hectares)	Permanent pasture (thousands of hectares)	Forest and woodland (thousands of hectares)	Cropland (hectares per capita)	Permanent pasture (hectares per capita)	Forest and woodland (hectares per capita)
Algeria	7,646	31,043	4,065	0.31	1.24	0.16
Bahrain	..	..	..	..	..	..
Egypt, Arab Rep.	2,621	0	31	0.04	0.00	0.00
Iran, Islamic Rep	15,050	44,000	18,020	0.26	0.76	0.31
Iraq	5,450	4,000	1,887	0.30	0.22	0.10
Israel	436	147	119	0.09	0.03	0.03
Jordan	398	791	70	0.10	0.20	0.02
Kuwait	5	136	2	0.00	0.06	0.00
Lebanon	301	10	80	0.11	0.00	0.03
Libya	2,155	13,300	690	0.47	2.92	0.15
Morocco	9,278	20,900	9,006	0.37	0.83	0.36
Oman	60	1,000	0	0.04	0.66	0.00
Qatar	..	..	..	..	..	..
Saudi Arabia	2,358	85,000	1,200	0.16	5.72	0.08
Syrian Arab Rep.	5,585	7,869	724	0.45	0.64	0.06
Tunisia	4,868	3,685	651	0.60	0.46	0.08
United Arab Emirates	39	200	3	0.02	0.13	0.00
Yemen, Rep	1,603	16,065	4,060	0.14	1.38	0.35

Not available.

Source: World Resources Institute, *World Resources 1994-95* (New York: Oxford University Press, 1994).

Energy use, 1991

	Energy intensity (kilograms of oil equivalent per dollar of GDP)	Share of primary energy consumption (percent)		Years of remaining reserves at current production levels	
		Natural gas	Heavy fuel oil	Oil	Natural gas
Algeria	0.59	60	<1	31	64
Bahrain	0.99	77	<1	8	43
Egypt, Arab Rep.	0.92	24	28	18	78
Iran, Islamic Rep	0.69	28	16	75	504
Iraq	0.65	8	19	135	815
Israel	0.21	0.16	26	n.a.	n.a.
Jordan	0.75	0	35	n.a.	n.a.
Kuwait ^a	1.07	53	7	230	316
Lebanon	0.60	0	43	n.a.	n.a.
Libya	0.50	37	18	42	196
Morocco	0.27	0	27	n.a.	n.a.
Oman	0.47	62	4	16	97
Qatar	0.92	81	<1	21	678
Saudi Arabia	0.72	37	8	80	97
Syrian Arab Rep	0.55	14	21	10	129
Tunisia	0.34	18	35	43	327
United Arab Emirates	0.97	48	6	118	209
Yemen, Rep	0.38	0	24	57	80 ^b

n.a. Not applicable.

^a Data are for 1990.

^b Ratio of reserves to current levels of primary energy consumption.

Source: World Resources Institute, *World Resources 1994-95* (New York: Oxford University Press, 1994), Organization for Economic Cooperation and Development, *Energy Statistics and Balances of Non-OECD Countries* (Paris, 1993).



Water and sanitation

	Freshwater resources, annual withdrawal (m ³ per capita) 1987			Population with access to safe drinking water (percent) 1990		Population with access to sanitation (percent) 1990	
	Total	Domestic	Industry/ agriculture	Urban	Rural	Urban	Rural
Algeria	160	35	125	85 ^a	55 ^a	80 ^a	40 ^a
Bahrain	310 ^c	186 ^c	124 ^c	100 ^b	57 ^b	100 ^b	24 ^b
Egypt, Arab Rep.	1,028	72	956	95	86	80	26
Iran, Islamic Rep	1,362	54	1 307	100	75	100	35
Iraq	4,575	229	4,346	93	41	96	18
Israel	410	66	344	100	97	99	95
Jordan	173	50	123	100	97	100	100
Kuwait	525	336	189	100		100	
Lebanon	271	30	241	100 ^a	100 ^a	94 ^a	18 ^a
Libya	2,830 ^a	708 ^a	2,122 ^a	100	80	100	85
Morocco	412	23	390	100	18	100	19
Oman	623	19	604	87	42	100	34
Qatar	159 ^c	54 ^c	96 ^c	100 ^a	100 ^a	94 ^a	18 ^a
Saudi Arabia	497	224	273	100 ^b	74 ^b	100 ^b	30 ^b
Syrian Arab Rep	435	30	405	91	68	72	55
Tunisia	317	41	276	100	31	71	15
United Arab Emrates	884	97	787	100	100	100	77
Yemen, Rep	324	16	308	88 ^a	33 ^a	68 ^a	30 ^a

. Not available.

a 1985 b 1988. c. 1975

Source: World Resources Institute, *World Resources 1994-95* (New York: Oxford University Press, 1994).

Population indicators

	Population (millions) 1992	Average annual popu- lation growth rate (%)		Urban population	
		1980-92	1992- 2000	Percentage of total 1995	Average annual growth rate (%) 1980-92
Middle East and North Africa	252.6	3.1	2.5		4.4
Algeria	26.3	2.8	2.2	55.8	4.9
Bahrain	0.5	4.9 ^a	3.7 ^b		
Egypt, Arab Rep	54.7	2.4	1.7	44.8	2.5
Iran, Islamic Rep.	59.6	3.5	2.8	60.4	5.0
Iraq	19.2	3.3 ^c	3.2 ^d	74.6	4.4 ^e
Israel	5.1	2.3	2.2	92.7	2.1
Jordan	3.9	4.9	3.4	71.5	6.0
Kuwait	1.4	4.5 ^c	5.8 ^d		5.0 ^e
Lebanon	3.8	-0.01 ^c	2.1 ^d	87.2	2.5 ^e
Libya	4.9	4.4 ^c	3.5 ^d	86.0	6.3 ^e
Morocco	26.2	2.5	1.8	48.4	3.8
Oman	1.6	4.3	4.1	13.2	8.2
Qatar	0.5	5.8 ^a	4.2 ^b		
Saudi Arabia	16.8	4.9	3.3	80.2	6.5
Syrian Arab Rep.	13.0	3.3	3.3	52.4	4.1
Tunisia	8.4	2.3	2.2	59.0	3.4
United Arab Emirates	1.7	4.0	2.0	84.0	5.0
Yemen, Rep.	13.0	3.8	3.3	33.6	7.3

Not available

a 1975-80 b 1985-90 c 1980-85. d 1990-95. e 1980-90

Source: World Resources Institute, *World Resources 1994-95* (New York: Oxford University Press, 1994)



Socioeconomic indicators

	Infant mortality rate (per thousand live births) 1992	Life expectancy at birth (years) 1992	Adult illiteracy (percent)		GNP per capita	
					US\$ 1992	Average annual growth (percent) 1980-92
			Female 1990	Total 1990		
Middle East and North Africa	58	64	57	45	1,950	-2.3
Algeria	55	67	55	43	1,840	-0.5
Bahrain	15 ^a	70	31	23	6,360 ^b	-3.8
Egypt, Arab Rep.	57	62	66	52	640	1.8
Iran, Islamic Rep	65	65	57	46	2,200	-1.4
Iraq	65 ^a	64	51	40	1,940 ^c	.
Israel	9	76	17 ^d	12 ^d	13,220	1.9
Jordan	28	70	30	20	1,120	-5.4
Kuwait	14 ^a	75	33	27	16,380 ^e	-0.8 ^f
Lebanon	45 ^a	66	27	20	.	.
Libya	78 ^a	63	50	36	5,410 ^b	-4.7 ^f
Morocco	57	63	62	51	1,030	1.4
Oman	20	70	.	.	6,480	4.1
Qatar	30 ^a	71	..	.	16,750	-11.2
Saudi Arabia	28	69	52	38	7,510	-3.3
Syrian Arab Rep.	36	67	49	36	1,325 ^g	1.4
Tunisia	48	68	44	35	1,720	1.3
United Arab Emirates	20	72	<5	<5	22,020	-4.3
Yemen, Rep.	106	53	74	62	557	2.2 ^h

a 1990 b 1988 c 1989 d 1970 e. 1989 f 1979-89 g GDP per capita h 1977-87

Source: World Resources Institute, *World Resources 1994-95* (New York: Oxford University Press, 1994),
World Bank, *World Development Report 1994* (New York: Oxford University Press, 1994)

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